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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,796	09/22/2005	Hideki Mori	SON-2943	4006
23353 7590 04/15/2009 RADER FISHMAN & GRAUER PLLC LION BUILDING 1233 20TH STREET N.W., SUITE 501 WASHINGTON, DC 20036				
EXAMINER MATTHEWS, COLLEEN ANN				
ART UNIT		PAPER NUMBER		
2811				
MAIL DATE		DELIVERY MODE		
04/15/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,796

Applicant(s)

MORI ET AL.

Examiner

Colleen A. Matthews

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7, 16 and 19-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7, 16 and 19-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S5108)
Paper No(s)/Mail Date 12/08/2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Species of Fig 1A-1B in the reply filed on 02/25/2008 is acknowledged.

Claim Rejections - 35 USC § 112

Claim 20 recites the limitation "said fuse" in line 2 and line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 24 recites the limitation "said fuse" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 25 recites the limitation "said fuse" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7, 16 and 19-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) of Figures 10A-10B in view of U.S. Pat. No. 5,708,291 to Bohr et al. (Bohr).

Re claims 7 and 14: AAPA discloses a semiconductor device comprising

a fuse (102) having a fuse body (102A) and two pads (102Ba, 102Bb) connected by the fuse body and two conductive layers (104A, 104B) individually connected to two pads, the above being formed inside a multilayer structure on a semiconductor substrate (100),

characterized in that a length (D0) of the fuse body (120A) is defined so that the melting location (102Ab) of the fuse becomes positioned in the fuse body away from a region overlapped on the conductive layers (Fig 10A shows melting portion 102Ab within fuse body 102A & Fig 10B shows that fuse body 102A is not covered or overlapped by conductive layers 104A, 104B) when an electrical stress is applied between the two conductive layers to melt the fuse.

AAPA fails to disclose a distance from the contact regions (103A, 1035B) connecting the conductive layers (104A, 104B) and the pads (102Ba, 102Bb) to edges of the pad contacting the fuse body (3A) is 0.25 to 0.90 μm .

Bohr discloses the width of a fuse (117) as 0.22 μm , the length of the fuse is 0.88 to 5.5 μm (Fig 1B, length of fuse body is 118, col 4 lines 1-5 describes length 118 as four to twenty-five times width of 117 which is 0.22 μm , so length 118 ranges from 0.88 to 5.5 μm) and that the dimensions can vary (col 3 lines 63-67 & col 4 lines 1-5). Bohr teaches the two connections (116) are tapered (col 3 lines 50-53) between the contact region (120) and the fuse region (122). Bohr further discloses the width of the portion of the conductive layers including the contact regions (120) with pads (101) can vary (col 4 lines 6-10).

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize a distance from the contact regions connecting the conductive layers and the pads to edges of the pad contacting the fuse body to 0.25 to 0.90 μm without cause for undue experimentation. *"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) see MPEP 2144.05.*

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA to have a distance from the contact regions connecting the conductive layers and the pads to edges of the pad contacting the fuse body as 0.25 to 0.90 μm as suggested by Bohr in order to accommodate difference processing technologies, space considerations and other fuse requirements (Bohr, col 3, lines 63-65).

Re claim 16: AAPA discloses semiconductor device comprising
a fuse (F1) including a conductive material (102) in a multilayer structure on a semiconductor substrate (100),
said fuse (F1) having a fuse body (102A) and two pads (102Ba, 102Bb)
connected by the fuse body (102A), conductive layers (104A, 104B) connected one by one to said two pads

characterized in that, in at least one of the above two conductive layers (104A,104B), there is a width of portions of the conductive layers (104A,104B) including contact regions (103A,103B) with pads.

AAPA fails to disclose the width of the portions of the conductive layers including the contact regions with the pads as 6 to 14 μm .

Bohr discloses the width of a fuse (117) as 0.22 μm and that the width can vary (col 3 lines 63-67 & col 4 lines 1-5). Bohr further discloses the width of the portion of the conductive layers including the contact regions (120) with pads (101) can vary (col 4 lines 6-10).

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize the width of the portions of the conductive layers including the contact regions with the pads to 6 to 14 μm without cause for undue experimentation. *"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."* In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) see MPEP 2144.05.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA to have the width of the portions of the conductive layers including the contact regions with the pads to 6 to 14 μm as suggested by Bohr in order to accommodate difference processing technologies, space considerations and other fuse requirements (Bohr, col 3, lines 63-65).

Re claims 19, 21-23: AAPA discloses semiconductor device comprising:

a fuse body (102A) connected to a pad (102Ba), said fuse body (102A) including a fuse line (102Aa) and two connections (102Ab);

an inter-layer insulating film (103) on said pad (102Ba), an opening (103A) through said interlayer insulating film (103) exposing said pad (102Ba);

a conductive layer (104A) on said inter-layer insulating film (103), said conductive layer (104A) within said opening (103A) being electrically connected to said pad (102Ba),

AAPA fails to disclose (a) the width (W3) of said conductive layer is 6 to 14 μm . Bohr discloses the width of a fuse (117) as 0.22 μm and that the width can vary (col 3 lines 63-67 & col 4 lines 1-5). Bohr further discloses the width of the portion of the conductive layers including the contact regions (120) with pads (101) can vary (col 4 lines 6-10).

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize the width of the portions of the conductive layers including the contact regions with the pads to 6 to 14 μm without cause for undue experimentation. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) see MPEP 2144.05.

AAPA fails to disclose (b) the distance (D4) between said fuse line (102Aa) and said opening (103A) is 0.25 μm to 0.90 μm . Bohr discloses the width of a fuse (117) as 0.22 μm , the length of the fuse is 0.88 to 5.5 μm (Fig 1B, length of fuse body is

118, col 4 lines 1-5 describes length 118 as four to twenty-five times width of 117 which is $0.22\text{ }\mu\text{m}$, so length 118 ranges from 0.88 to $5.5\text{ }\mu\text{m}$) and that the dimensions can vary (col 3 lines 63-67 & col 4 lines 1-5). Bohr teaches the two connections (116) are tapered (col 3 lines 50-53) between the contact region (120) and the fuse region (122). Bohr further discloses the width of the portion of the conductive layers including the contact regions (120) with pads (101) can vary (col 4 lines 6-10).

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize a distance between said fuse line and said opening to 0.25 to $0.90\text{ }\mu\text{m}$ without cause for undue experimentation.

AAPA fails to disclose (c) said length (L1) of the fuse body is 1.8 to $20\text{ }\mu\text{m}$.

Bohr teaches a fuse body including a fuse line (122) and two connections (116). Bohr teaches the two connections (116) are tapered (col 3 lines 50-53) between the contact region (120) and the fuse region (122). Bohr further teaches the length of the fuse line (Length 118) as 1.8 to $20\text{ }\mu\text{m}$ (Fig 1B, 118, col 4 lines 1-5 describes length 118 as four to twenty-five times width of 117 which is $0.22\text{ }\mu\text{m}$, so length 118 ranges from 0.88 to $5.5\text{ }\mu\text{m}$), that the length may vary and that the contact region may also vary in size (col 4 lines 1-10).

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize the length of the fuse body to 1.8 to $20\text{ }\mu\text{m}$ without cause for undue experimentation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA to have the width of the portions of the conductive layers including the contact regions with the pads to 6 to 14 μm , a distance between said fuse line and said opening to as 0.25 to 0.90 μm and to have the length of the fuse body 1.8 to 20 μm as suggested by Bohr in order to accommodate difference processing technologies, space considerations and other fuse requirements (Bohr, col 3, lines 63-65).

Re claim 20: semiconductor device as set forth in claim 19, wherein the melting location of said fuse (F1/102) becomes positioned in said fuse body (102A) away from a region overlapped (Fig 10A shows melting portion 102Ab within fuse body 102A & Fig 10B shows that fuse body 102A is not covered or overlapped by conductive layers 104A, 104B) on said conductive layer (104A) when an electrical stress to melt said fuse (F1/102) is applied between said conductive layer (104A) and another conductive layer (104B).

Re claim 24: semiconductor device as set forth in claim 19, wherein said width (W3) is a dimension perpendicular to the direction of current flowing through said fuse (F1/102).

Re claim 25: semiconductor device as set forth in claim 19, wherein said length (L1) is a dimension in the direction of current flowing through said fuse (F1/102), said length (L 1) including the length (L0) of said fuse line (102Aa) and the lengths (L2) of said two connections (102Ab).

Re claim 26: semiconductor device as set forth in claim 19, wherein another conductive layer (104B) within another opening (103B) through said inter-layer insulating film (103) is electrically connected to another pad (102Bb), the distance (as considered from the outside edge of 104A to outside edge of 104B) between said conductive layer (104A) and said another conductive layer (104B) is larger than said length (L1).

Re claim 27: semiconductor device as set forth in claim 19, wherein one of the connections (102Ab) electrically connects said pad (102Ba) with fuse line (102Aa), said one of the connections (102Ab) being between said pad (102Ba) and said fuse line (102Aa).

Re claim 28: semiconductor device as set forth in claim 19, wherein each of said two connections (102Ab) is wider than said fuse line (102Aa) (see Fig 10A).

Re claim 29: semiconductor device as set forth in claim 19, wherein a connection (102Ab) of said two connections (102Ab) has a width that increases toward said pad (102Ba) (see Fig 10A).

Re claim 30: semiconductor device as set forth in claim 19, wherein the width of the fuse body (102A) is smaller than the width (W3) of said pad (102Ba) (see Fig 10A).

Re claim 31: semiconductor device as set forth in claim 19, wherein one of the two connections (102Ab) electrically connects said pad (102Ba) with said fuse line (102Aa).

Re claim 32: semiconductor device as set forth in claim 31, wherein another of the two connections (102Ab) electrically connects another pad (102Bb) with said fuse line (102Aa).

Re claim 33: semiconductor device as set forth in claim 32, wherein another conductive layer (104B) within another opening (103B) through said interlayer insulating film (103) is electrically connected to said another pad (102Bb), the distance (as considered from the outside edge of 104A to outside edge of 104B) between said conductive layer (104A) and said another conductive layer (104B) is larger than said length (L 1).

Re claim 34: semiconductor device as set forth in claim 33, wherein said length (L1) is the distance between said pad (102Ba) and said another pad (102Bb).

Response to Arguments

Applicant's arguments filed 01/21/2009 have been fully considered but they are not persuasive.

Applicant argues that Bohr does not disclose the distance, width and length as claimed in claim 7, 16 and 19 because the Office uses a "gap-filler" based on the scale of the drawings and the Office fails to identify a written description teaching the distance.

In response, the Examiner notes that the specification is not completely silent to the dimensions and does have written description of dimensions corresponding to the

figures, for example (col 3 line 63-col 4 line 10). The specification disclosure when viewed with the drawings provides adequate disclosure of the claimed inventions range of dimensions. *However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonably teach one of ordinary skill in the art. In re Wright, 569 F.2d 1124, 193 USPQ 332 (CCPA 1977) – See MPEP 2125.*

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen A. Matthews whose telephone number is

(571)272-1667. The examiner can normally be reached on Monday - Friday 8AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. A. M./
Examiner, Art Unit 2811

/Lynne A. Gurley/
Supervisory Patent Examiner, Art
Unit 2811